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Socioeconomic aspects of the char areas of Lalmonirhat district

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Abstract
Socioeconomics (also known as social economics) is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how modern societies progress, stagnate, or regress because of their local or regional economy, or the global economy. The socioeconomic system at the regional level refers to the way social and economic factors influence one another in local communities and households. These systems have a significant impact on the environment through deforestation, pollution, natural disasters, and energy production and use. Through telecoupled systems, these interactions can lead to global impact. Local economies, food insecurity, and environmental hazards are all negative effects that are a direct outcome of socioeconomic systems. This conducted at different areas of Lalmonirhat district. Primary data was collected from total 60 farmers selected randomly. Soil condition, family size with dependency ratio, credit availability, people affected by river erosion or flood, loss of agricultural land, land cultivation pattern and environmental impact were studied. The study recommends that local adaptation practices should be scrutinized, the role of institutional support should be highlighted and national adaptation strategies and resilience should be strengthened.

Keywords: Socioeconomics, vulnerable, *Char* area

Introduction

The landscape of Bangladesh is primarily composed of deltaic floodplains with a predominantly humid tropical climate. The demography of the country is marked by extremely high population density (>1000 persons per km^2). In addition to this, the country has a low resource base and high incidence of natural disasters, making it a highly vulnerable region. The agricultural sector is a large contributor to economic development of the country contributing to 14 % of its GDP and employing more than 49% of the population (Bangladesh Economic Review, 2021). Most scientific surveys list Bangladesh as the most vulnerable country to the impacts of the global environmental phenomenon. Therefore, developing measures that can ensure food and livelihood security, especially in the face of accelerating extreme climate events such as droughts, erratic rainfall patterns, cyclones and floods, is a priority.

Bangladesh needs to increase the rice yield in order to meet the growing demand for food emanating from population growth. Currently, In Bangladesh 61% of the total cropped area in the Rabi season is under *Boro* cultivation which contributes 55% to total rice production (BBS, 2018). DSSAT (Decision Support System for Agrotechnology Transfer) model has predicted significant reduction in *Boro* rice yield due to climate change. Yield reductions of over 20% and 50% have been predicted for the years 2050 and 2070 respectively (Basak *et al.* 2010). Karim *et al.* (1996) argued that a significant yield reduction may occur in rice (35%) due to changing climatic conditions in the future.

Agriculture is the backbone of the country and is synonymous to the food security of the county. Attaining food self-sufficiency 2013 along with ensuring food to all is adopted in the vision 2021 of the government of Bangladesh (Planning Commission). Bangladesh has a large agrarian base with 76 percent of total population is living in the rural areas and 90 percent of the rural population directly related with agriculture. Increasing food production and attaining food security in Bangladesh require sustainable growth of agricultural sector. The Agro-economic contribution is 13.47 percent of the Gross Domestic Product (Bangladesh Economic Review, 2021).

Decrease of agricultural land is one of the alarming characteristic of agriculture in Bangladesh- a country that highly depends on agriculture. Agricultural land in Bangladesh was measured at 92 percent of land area in 1976, which reduced to 87.69 percent and 83.53 percent over the years of 2000 and 2010 respectively (Hasan, *et al.* 2013) [9]. Agriculture in Bangladesh is already under pressure, both from huge and increasing demands for food as well as from obstacles related to the degradation of agricultural land and water endowments (Ahmed *et al.* 2000) [1].

All measured parameters can be used for specific field operations, such as an irrigation events schedule, pest alarm model as well as the determination of the right time for crop fertilization and protection. Farming based on weather data is crucial to successful farm management. More importantly, it ensures sustainable farming, thus protecting the environment. Farmers today use systems for precision measurement of environmental conditions called weather

stations. Various types are and according to a number of measured parameters, work precision, work range. Farming is the most important industry, as it provides us with life sustaining food. Although affected numerous consequences of climate change, farming has to be more productive and sustainable than ever. In this manner, accurate weather monitoring is essential to achieve healthy plants and increased productivity and profitability.

Research Methodology

In conducting a research study on a scientific investigation, methodology is an important part. It helps to collect valid and reliable information and also arrive at a meaningful conclusion. From this point of view, a great care was taken in using appropriate method. The methods and procedures that were followed in conducting this study have been described in this chapter.

Methodology

Methodology deserves a very careful consideration in any research. The methodology of the present study involved the following steps.

Selection of the Study Area

A research on impacts of climatic variable on major field's crops topics requires the selection of an area where the objectives of the study can be fulfilled. Necessary data were obtained from the selected area in order to achieve the objectives set for the research. Some char areas of Hatibandha Upazilla under Lalmonirhat district have been considered as the study area. Three char areas have been selected. Selected char areas are a) Char Sendurna, b) Char Karibari, and c) Char Nohali.

Location and Topography of the Study Area

The study area is located under Lalmonirhat district.

Photo 1: Map of Lalmonirhat District

Lalmonirhat District is bounded by West Bengal of India on the north, Rangpur and Kurigram districts on the south, Kurigram district on the east and Nilphamari district on the west. It is located at 25º48'00"- 88º38'00" E and 26º27'00" N- 89º36'00" E. There are some prominent rivers exists in this district. These are Teesta, Dharla, Ratnai, Saniajan etc. It is a flash flood prone area. Habitants of this district faces this challenge every year (BWDB, 2019). Lalmonirhat is one of the potential district of Bangladesh in all respect. The most obvious Physiographic characterizing the landscape is

its extensive networks of rivers that considerably to the human life, agriculture, environment and socioeconomic life of the nation.

Selection of Samples

Sampling is the motherboard or core of any research. It is the basic step to begin with like a scaffold it should be distinct and strong to support the foundation here after built upon it further. When a research question is framed and underlying hypothesis is assumed, one needs to collect data from the target group of individuals obtained from sample which is again obtained from the general population. Sampling is important because it is impossible to (observe, interview, survey, etc.) an entire population. When surveying, however, it is vital to ensure the people in your sample reflect the population or else you will get misleading results. A total 60 farmers (20 farmers from each area) were selected randomly as the sample for observation and data collection.

Data Sources and Acquisition Method

The research is based on both primary sources of data and information. Primary data was collected through field survey. Secondary data and information were collected from various governmental organizations.

Primary data collection

The field observation study was carried out through by personal interview with local for data collection during the period of 1 October to 1 November, 2019. All possible efforts were made to explain the purpose of the study to the respondents in order to get actual and valid information from them and they were assured that the study was purely an academic one which is not likely to have any adverse effects on them. After each interview, the filled in schedules were checked with regard to every item so that these were correct and properly recorded.

Secondary data collection

Daily data of different parameters will be collected from respected department.

Analysis of Data

After completion of collecting data they were compiled, tabulated and analyzed according to the objective of the study. Data were put in Microsoft excel and Mat Lab for statistical analyze. Socioeconomic data were analyzed by using Microsoft excel and climatic data were analyzed by using MATLAB software. The regression equations and the coefficient of determination (R) have been obtained through scatter diagrams.

Socioeconomic data were presented mostly in the tabular and graphical form. These forms are simple in calculation, widely used and easy to understand. Graphical representation of the data was done in Microsoft Excel. Descriptive statistics like sum, average, percentage and ratios were calculated to scrutinize the socioeconomic characteristics of the sample farmers.

Results & Discussion

Socioeconomic Aspects of the Displaces

Description of the Study Area

Lalmonirhat is a district, situated at the northern border of Bangladesh. It is a part of the Rangpur Division. Lalmonirhat mahakuma was established as a district on 1 February 1984. It lies north of Kochbihar and Jalpaiguri of West Bengal, south of Ranpur, east of Kurigram and Kochbihar and west of Rangpur and Nilphamari district.

Soil Condition

The soil formation of the Lalmonirhat is flood plain, grey piedmont, hill brown and terrace. The textural classes were sandy loam, silty loam, loam and clay loam in the studied areas. The soils in these locations are acidic in nature. Most of the soil contained low to very low organic matter content (SRDI, 2019).

Family Size of the Respondents

A household is defined as all persons living under one roof or occupying a separate housing unit having either direct access to the outside or a separate cooking facility. Where the members of a household are related by blood or law, they constitute a family. On the basis of the family size the respondents were classified into three following categories as shown in table. Hutton and Haque (2004) [11] find out that the most of the char land people in Bangladesh are poor and their family size is large. Maximum people in the affected area by Jamuna and Brahmaputra river erosion have large family size having more than six family members and their life style is so poor. According to his research more than 48% people live below poverty line in the char land areas. Table shows that the household size, average household size and dependency ratio.

Table 4.1: Distribution of respondents according to their family size

Family size	Frequency of respondents	Percentage (%)
Small (up to 4)	17	28
Medium (5to 6)	24	40
Lage (More than 6)	29	32
Total	60	100

Source: Field survey, 2019.

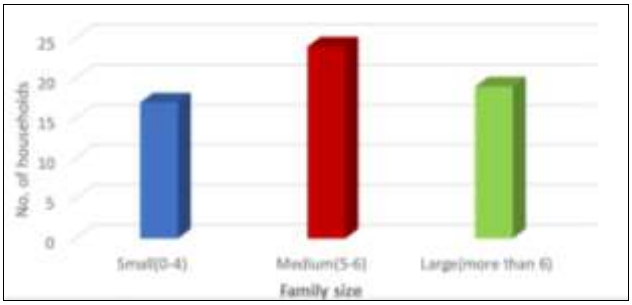

Fig 4.1: Family size of the respondents

Average family size and dependency ratio

The table shows that the average household size and dependency ratio. The average household size was 6, which was higher than the national average of 4.5 (HIES, 2010)

Table 4.2: Average Family Size and Dependency Ratio

Family members(no.)			Earning members (no.)			Dependency ratio
Male	Female	Total (i)	Male	Female	Total(ii)	(iii=i÷ii)
4	2	6	2	0	2	3

Source: Field survey, 2019.

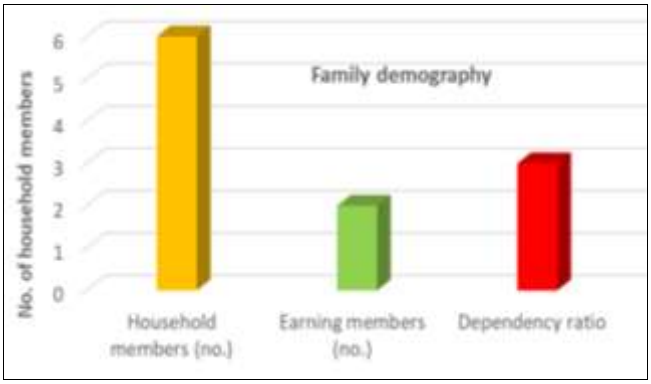

Fig 4.2: Average household size and dependency ratio

However, the dependency ratio expresses how many member of a household dependent on economically working and earning person of that household. In the study areas the number of economically working and earning person and dependency ratio were 2 and 3 respectively.

Credit Availability of the Respondents

On the basis of source of credit availability, the respondents were classified into following categories as shown in table. This table indicated that majority (48.4%) of the respondent were related with different types of NGOs in case of their credit transition. Only 3.3% of the respondents were involved in government bank for loan. About 20% of the respondents depended on their friends and relatives in case of money for emergency need. 15% were depended on village money lenders as getting loan and 5% received money from both govt bank and NGOs. So it is clear that the government bank contributes a little help for the affected people in the study area.

Table 4.3: Distribution of respondents according to their credit availability

Sources of credit	Frequency of respondents	Percentage (%)
Govt. Bank	2	3.3
NGOs	29	48.4
Friends and Relatives	12	20
Village money lender	9	15
Govt. bank and NGO	3	5
Relative and NGO	5	8.3
Total	60	100

Source: Field survey, 2019.

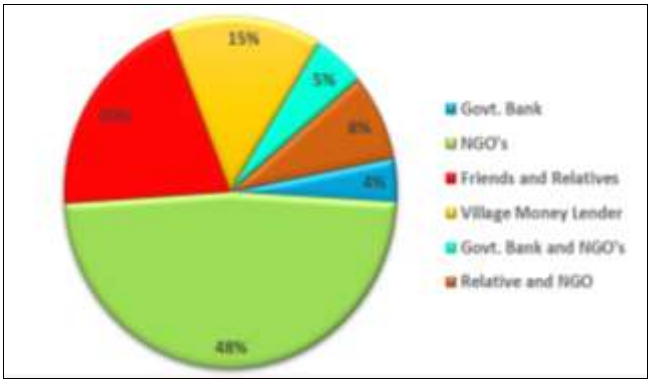

Fig 4.3: Credit availability in the study area

Finnegan *et al*. (2008) [8] identified only 9% affected people by natural calamities get help from government bank. Most of the people receive help from NGOs and village money lenders with high rate of interest.

People Affected by River Erosion and Flood

On the basis of erosion affects, the respondents are classified into four categories as shown in the following graph as high, medium, low and not ever.

Table 4.4: People affected by river erosion and flood

Categories	Pecentage of respondents (%)
High	45
Medium	30
Low	13.3
Not ever	11.6
Total	100

Source: Field survey, 2019.

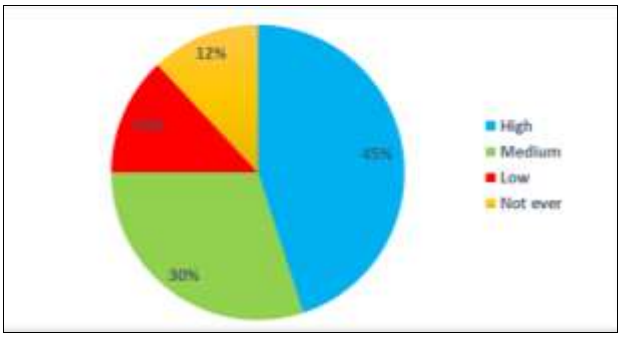

Fig 4.4: Percentage of affected people in the study area

Data presenting in the table showed that the majority of the respondents 45% are highly affected, 30% are moderately affected, 13.3% are less affected and 11.6% respondents were not ever affected by riverbank erosion attack in the study area. Ahamed (2001) [2] described that the riverbank erosion is a constant and old disaster that has rendered the formation of the char land of Bangladesh. Erosion is a continuous process for which the disaster fails to generate concern that other forms of disaster are capable of creating. It causes enormous loss of lives and properties. According to the satellite data the river consumes about 8700 hectors of arable land every year and about 10 lakh peoples were affected. In 1998, 6 lakh households and about 50 lakh peoples were directly affected by the riverbank erosion.
Viswanathan and Ravi (2007) [17] also revealed that in 2007 nearly 14 Million people (10% of the population) in more than 20 districts were affected by the floods limited to the Brahmaputra River.

Loss of Agricultural Land

Riverbank erosion has a great impact on agriculture. It also affects the crop diversity. Rice growing fertile cultivable land is becoming unsuitable for rice cultivation due to sand deposition. The fertility of the land is reduced as a result of erosion and sand deposition, the yield of the land is declined. The information taken from the respondents, people losses their cultivable lands divided into three categories shown in table 4.5.
It shows that majority of the respondents 61.6% in Char Sendurna, 70% in Char Karibari and 71.6% in Char Nohali loss their land 1-5 acres. It also found that 26.6% in Char Sendurna 23.4% in Char Karibari and 20% in Char Nohali loss their land 6- 10 acres. Within these losses the crop production became vulnerable and reduces the productivity.

Again another proportion shows that 11.6% in Char Sendurna, 6.6% in Char Karibari and 8.4% in Char Karibari loss no land.

Table 4.5: Amount of losses of agricultural land in the study areas

Village	Acreage of land	Frequency of respondents	Percentage (%)
Char Sendurna	1-5	37	61.6
	6-10	16	26.6
	No	7	11.6
Char Karibari	1-5	42	70
	6-10	14	23.4
	No	4	6.6
Char Nohali	1-5	43	71.6
	6-10	12	20
	No	5	8.4

Source: Field survey, 2019.

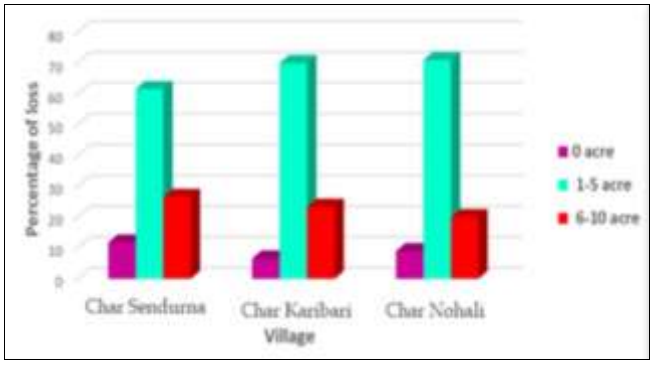

Fig 4.5: Amount of losses of agricultural land in the study areas

Pahuja and Goswami (2006) [14] identified that every year the Brahmaputra river causes extreme flood in both India and Bangladesh. It also found that the Brahmaputra river has destroyed nearly 4000 km^2 of agricultural land. Sarker *et al*. (2003) [15] revealed that in Bangladesh most of the char land is fertile cultivable land and huge amount of these are eroted by only Jamuna river.

Land Cultivation Pattern in the Study Area

Another important legal consideration in deciding the future of the land is determining the types of legal ownership of your land. These determine who controls the land, how it is transferred, how it is taxed, and how liability will be shared. On the basis of cultivation pattern, the respondents were classified into three categories as shown in table 4.10. Data presented in figure-4.10 showed that 40% of the respondents had no land for cultivation. Only 27% respondents own land for cultivation and 33% respondents were sharecroppers. BDER (2004) reported in a study that due to river bank erosion land cultivation process and pattern also changed.

Table 4.6: Distribution of respondents according to their land cultivation pattern

Types of land cultivation	Frequency of respondents	Percentage
Own land	16	27
Share cropper	20	33
No cultivation	24	40
Total	60	100

Source: Field survey, 2019.

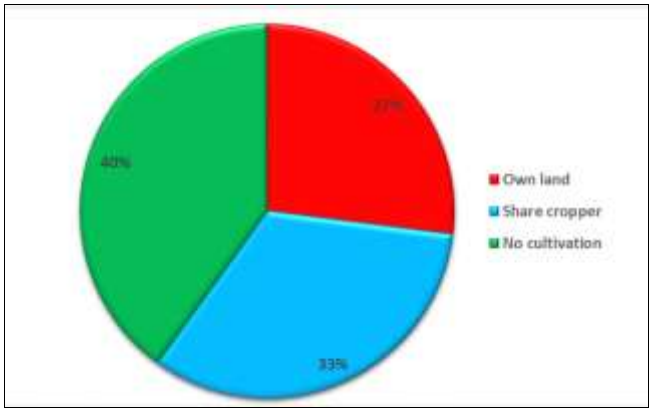

Fig 4.6: Land cultivation pattern

People who have own land try to cultivate seasonal crop varieties but who have lost land in the river affection could not cultivate as their own choose. They choose crop varieties which is suitable for their soil structure.

Environmental Impact

The key environmental issues identified in the basin were river bank erosion, flooding and droughts. The basin's residents reported that bank erosion is a continuous phenomenon. River bank erosion results in loss of livelihood mainly agricultural produce, contamination of drinking water, outbreak of diseases, loss of infrastructure (mainly housing, hospital, roads and bridges among others) and loss of ecosystems. River bank erosion and its impacts were clear during field observations. The residents reported that flooding is an annual occurrence, while droughts are more erratic. They vary temporally and spatially. Prolonged dry spells in the basin as a results of deficits in the monsoon confronts families with unprecedented hardships. The environmental hazard experienced by affected people in the study area in last during last ten years as shown in table 4.11. Kabir (2006) [12] described that chars are areas of new land formed through the continuous process of erosion and deposition in the major rivers and coastal areas.

Table 4.7: Natural calamities experienced by affected people in the study area

Name of the calamities	Extent of damage			
	High	Medium	Low	Not ever
Flood	✓	-	-	-
River erosion	✓	-	-	-
Drought	-	✓	-	-
Cyclone		-	-	✓
Spread of pest	✓	-	-	-

Source: Field survey, 2019.

Chars land areas irrespective of their geographic attachment to the mainland and distance from the growth centers are particularly vulnerable to floods, drought and river erosion. They suffer much from extreme attack of insects and pests during flood and river erosion.

Conclusion and Limitations of the Research

Social economics attempts to explain how social factors impact economic activity in society by drawing upon information from fields such as history, philosophy, sociology, and political science. Social economics certainly exerts a profound impact on the lives of individuals, and their socioeconomic status may strongly influence their

future achievements, level of education, and degree of financial security.

The limitations of the study are those characteristics of design or methodology that impacted or influenced the interpretation of the findings from the research. They are the constraints on generalizability, applications to practice, and/or utility of findings that are the result of ways in which you initially chose to design the study or the method used to establish internal and external validity or the result of unanticipated challenges that emerged during the study.

- Socioeconomic characteristics of the farmers included a wide range of variations. Only 60 farmers might not represent a generalized picture of the country.
- The area of research did not cover entire Bangladesh owing to the extremely varied climatic conditions in each region which could have resulted in erroneous and biased results.

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